



U.S. CONSUMER PRODUCT SAFETY COMMISSION  
WASHINGTON, DC 20207

OFFICE OF THE GENERAL COUNSEL

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Assistant General Counsel  
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July 9, 2001

Mr. Rick Hind  
Legislative Director  
Greenpeace Toxics Campaign  
702 H St., N.W., Suite 300  
Washington, DC 20001

Dear Mr. Hind:

Your submission to Ann Brown dated June 6, 2001 has been forwarded to the Office of the General Counsel for a determination as to whether some or all of it meets Commission requirements set forth in 16 CFR part 1051 for docketing as a petition for rulemaking. The submission requests that the Commission take the following specific actions:

- Immediately issue a warning in the Federal Register advising manufacturers, retailers and distributors and parents to end the unnecessary production, sale and use, respectively, of vinyl consumer products
- Begin regulating vinyl (PVC plastics) as a hazardous material
- Prohibit the use of all phthalates and organotins, in addition to lead, cadmium and other toxic or untested additives, in all consumer products

For the reasons discussed below, these requests do not meet statutory or Commission regulatory requirements for docketing as petitions for rulemaking.

1. Issue Federal Register warning concerning vinyl consumer products

You request that the Commission "immediately issue a warning in the Federal Register advising manufacturers, retailers and distributors and parents to end the unnecessary production, sale and use respectively, of vinyl consumer products." This request would not require

rulemaking to implement and accordingly is not being docketed as a petition for rulemaking under the Commission's rules. 16 CFR 1051.5(a)(5).

A more fundamental problem with the requested warning is that it is unclear from your submission on what factual basis or under what authority the Commission might issue it. Finally, the submission does not contain information sufficient to determine to which specific consumer products such a warning

## 2. Begin regulating "vinyl (PVC plastics)" as a hazardous material

You request that the Commission "begin regulating vinyl (PVC plastics) as a hazardous material." Such a request would most likely be addressed via rulemaking under the Federal Hazardous Substances Act (FHSA).<sup>1</sup> To make a determination under § 2(f)(1)(A) of the FHSA that "vinyl (PVC plastics)" are a "hazardous substance," the Commission must find that all such items are "toxic," and that they "may cause substantial illness during or as a proximate result of any customary or reasonably foreseeable handling or use, including foreseeable ingestion by children."<sup>2</sup>

Section 3(a)(2) of the FHSA requires that a rulemaking, such as the one that is the subject of this request, be conducted in accordance with § 701(e) of the Federal Food, Drug, and Cosmetic Act (FDCA).<sup>3</sup> Under § 701(e), for the Commission to proceed to rulemaking, the petition must set forth "reasonable grounds" for the requested action. The United States Court of Appeals for the District of Columbia Circuit has held that "reasonable grounds" for a petition under the FHSA "are grounds from which it is reasonable to conclude that the Commission would be able to make the findings required to issue the requested rule and to support those findings with substantial evidence on the record."<sup>4</sup> A submission must identify "the product (or products) regulated under the Consumer Product Safety Act or other statute the Commission administers for which a rule is sought." 16 CFR 1051.5(a)(3). A submission must "set forth facts which establish the claim that the issuance of the rule is necessary." 16 CFR 1051.5(a)(4). "A general request for regulatory action which does not reasonably specify the type of action requested shall not be sufficient for purposes of this subsection." 16 CFR 1051.5(a)(5).

Your request does not identify the specific consumer products of concern within the broad category of "vinyl (PVC plastics)," the specific toxic constituent(s) and their concentration(s) in each product of concern, the mechanism of exposure to and/or uptake of each such constituent, or the "substantial illness" that might result from customary or reasonably foreseeable handling or use of each such product -- all of which would be necessary predicates for a Commission determination that such a product or products were "hazardous substances" for purposes of the FHSA. Thus, this portion of the submission does not satisfy the statutory

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<sup>1</sup> In the absence of special circumstances, the Commission would be required by § 30(d) of the Consumer Product Safety Act (CPSA) to conduct the requested rulemaking under the FHSA as opposed to the CPSA. Gulf South Insulation v. CPSC, 701 F.2d 1137 (5<sup>th</sup> Cir. 1983).

<sup>2</sup> 15 U.S.C. 1261(f)(1)(A).

<sup>3</sup> 15 U.S.C. 1262(a)(2).

<sup>4</sup> Consumer Federation of America v. CPSC, 883 F.2d 1073, 1076 (D.C. Cir. 1989).

"reasonable grounds" and other criteria and does not qualify under docketed as a petition for rulemaking.

3. Prohibit the use of all phthalates and organotins, in addition to lead, toxic or untested additives in all consumer products

You request that the Commission "prohibit the use of all phthalates and organotins, in addition to lead, cadmium and other toxic or untested additives in all consumer products." To issue a ban under the FHSA, the Commission must first determine, as noted above, that the product at issue is a "hazardous substance." Having made the hazardous substance determination, the Commission must then find with respect to each such product (other than a toy or other article intended for the use of children) that:

[N]otwithstanding such cautionary labeling as is or may be required under this Act [the FHSA] for that substance, the degree or nature of the hazard involved in the presence or use of such substance in households is such that the objective of the protection of public health and safety can be adequately served only by keeping such substance ... out of the channels of interstate commerce.

FHSA § 2(q)(1)(B); 15 U.S.C. 1261(q)(1)(B).

Section 2(q)(1)(B) is the appropriate section of the FHSA under which to consider the request for a ban in light of the statement in the submission that it is intended to address "all PVC products used in the home," whether or not "intended for use by children." Section 2(q)(1)(A) applies only to products intended for use by children.

As with the prerequisite "hazardous substances" determination, a ban determination under § 2(q)(1)(B) must be accomplished using the procedures of § 701(e) of the FDCA.<sup>5</sup> Thus, your request for a ban is also subject to the "reasonable grounds" test of § 701(e).<sup>6</sup>

The submission does not provide information sufficient to identify: 1) any specific substances within the generally stated categories of "all phthalates and organotins, in addition to lead, cadmium and other toxic or untested additives;" 2) the specific products of concern; 3) the pertinent toxic constituent(s) or their concentration(s) in each product of concern; 4) the mechanism of exposure to and/or uptake of each such constituent; or 5) the "substantial illness" that might result from customary or reasonably foreseeable handling or use of each such product -- all necessary predicates for a Commission determination that each is a "hazardous substance" for purposes of the FHSA.<sup>7</sup>

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<sup>5</sup> FHSA § 2(q)(2); 15 U.S.C. 1261(q)(2).

<sup>6</sup> 21 U.S.C. 371(e).

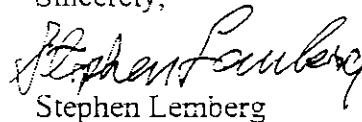
<sup>7</sup> With respect to diisononyl phthalate (DINP), which is mentioned specifically in the submission, the Chronic Hazard Advisory Panel appointed by the Commission to address risks posed by DINP submitted its report, copy enclosed, to the Commission on June 15, 2001. Among other things, that report states:

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With respect to the requested ban, the submission does not provide information regarding any constituent or product explaining why the degree or nature of the hazard involved in the presence or use of such product in households is such that the objective of the protection of public health and safety can be adequately served only by banning it. Accordingly, the request for a ban does not satisfy the previously discussed "reasonable grounds" criterion as to a petition for rulemaking under § 2(q)(1)(B) of the FHSA.

For the reasons given above, we are unable to docket your requests as petitions for rulemaking at this time. If you desire to make another submission to the CPSC requesting action concerning use of PVC in consumer products, please address the issues raised in this letter. Any such subsequent submission will be considered accordingly under the criteria of the FHSA and the Commission's rules at 16 CFR part 1051 for docketing of petitions for rulemaking. To assist you in that regard, a copy of these regulations is enclosed. In the meantime, I appreciate your sharing your concerns with the Commission.

Sincerely,

  
Stephen Lemberg

Enclosures

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The CHAP concludes that humans do not currently receive DINP doses from DINP-containing consumer products that are plausibly associated with a significant increase in cancer risk.

*Report to the U.S. Consumer Product Safety Commission by the CHRONIC HAZARD ADVISORY PANEL ON DIISONONYL PHTHALATE (DINP), June 2001, at 5.*

Thus, with respect to a ban on use of DINP in consumer products, it would be necessary for the submission to contain information sufficient to enable the Commission to reasonably determine that this conclusion of the CHAP was incorrect.

## Consumer Product Safety Commission

§ 1051.1

Commission in 29 CFR part 1613 pursuant to section 501 of the Rehabilitation Act of 1973, 29 U.S.C. 7911.

(c) The Office of Equal Employment Opportunity and Minority Enterprise shall be responsible for coordinating implementation of this section. Complaints may be sent to the Director, Office of Equal Employment Opportunity and Minority Enterprise, Consumer Product Safety Commission, Washington, D.C. 20207.

(d) The agency shall accept and investigate all complete complaints for which it has jurisdiction. All complete complaints must be filed within 180 days of the alleged act of discrimination. The agency may extend this time period for good cause.

(e) If the agency receives a complaint over which it does not have jurisdiction, it shall promptly notify the complainant and shall make reasonable efforts to refer the complaint to the appropriate government entity.

(f) The agency shall notify the Architectural and Transportation Barriers Compliance Board upon receipt of any complaint alleging that a building or facility that is subject to the Architectural Barriers Act of 1968, as amended (42 U.S.C. 4151-4157), or section 502 of the Rehabilitation Act of 1973, as amended (29 U.S.C. 7921), is not readily accessible to and usable by handicapped persons.

(g) Within 180 days of the receipt of a complete complaint for which it has jurisdiction, the agency shall notify the complainant of the results of the investigation in a letter containing—

(1) Findings of fact and conclusions of law;

(2) A description of a remedy for each violation found; and

(3) A notice of the right to appeal.

(h) Appeals of the findings of fact and conclusions of law or remedies must be filed by the complainant within 90 days of receipt from the agency of the letter required by § 1051.170(g). The agency may extend this time for good cause.

(i) Timely appeals shall be accepted and processed by the head of the agency.

(j) The head of the agency shall notify the complainant of the results of the appeal within 90 days of the receipt of the request. If the head of the agency

or determines that additional information is needed from the complainant, he or she shall have 60 days from the date of receipt of the additional information to make his or her determination on the appeal.

(k) The time limits cited in paragraphs (g) and (j) of this section may be extended with the permission of the Assistant Attorney General.

(l) The agency may delegate its authority for conducting complaint investigations to other Federal agencies, except that the authority for making the final determination may not be delegated to another agency.

(M) 49 FR 4575, 4576, Feb. 5, 1984, as amended at 51 FR 1576, Feb. 5, 1986.

§ 1051.171-1051.199 (Reserved)

## PART 1051—PROCEDURE FOR PETITIONING FOR RULEMAKING

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1051.1 Scope.

1051.2 General.

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1051.6 Documents not considered petitions.

1051.7 Statement in support of or in opposition to petitions; Duty of petitioners to remain apprised of developments regarding petitions.

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1051.9 Factors the Commission considers in granting or denying petitions.

1051.10 Granting petitions.

1051.11 Denial of petitions.

Authority: 5 U.S.C. 552; 15 U.S.C. 363, et seq.

Source: 49 FR 57122, Dec. 23, 1984, unless otherwise noted.

1051.1 Scope.

A. This part establishes procedures for the submission and disposition of petitions for the issuance, amendment or revocation of rules under the Consumer Product Safety Act (CPSA), 15 U.S.C. 2051 et seq., or other statutes administered by the Consumer Product Safety Commission.

B. Persons filing petitions for rulemaking shall follow as closely as possible the requirements and are encouraged to follow as closely as possible the recommendations for filing petitions under § 1051.5.

(c) Petitions regarding products regulated under the Federal Hazardous Substances Act (FHSA) (15 U.S.C. 1261 *et seq.*) are governed by existing Commission procedures at 16 CFR 1500.82. Petitions regarding the exemption of products regulated under the Poison Prevention Packaging Act of 1970 (PPPA) (15 U.S.C. 1471 *et seq.*) are governed by existing Commission procedures at 16 CFR part 1702. In addition, however, persons filing such petitions shall follow the requirements and are encouraged to follow the recommendations for filing petitions as set forth in § 1051.5.

[48 FR 57123, Dec. 28, 1983 as amended at 64 FR 48704, Sept. 3, 1999]

#### § 1051.2 General.

(a) Any person may file with the Commission a petition requesting the Commission to begin a proceeding to issue, amend or revoke a regulation under any of the statutes it administers.

(b) A petition which addresses a risk of injury associated with a product which could be eliminated or reduced to a sufficient extent by action taken under the Federal Hazardous Substances Act, the Poison Prevention Packaging Act of 1970, or the Flammable Fabrics Act may be considered by the Commission under those Acts. However, if the Commission finds by rule, in accordance with section 30(d) of the CPSA, as amended by Public Law 94-284, that it is in the public interest to regulate such risk of injury under the CPSA, it may do so. Upon determination by the Office of the General Counsel that a petition should be considered under one of these acts rather than the CPSA, the Office of the Secretary shall docket and process the petition under the appropriate act and inform the petitioner of this determination. Such docketing, however, shall not preclude the Commission from proceeding to regulate the product under the CPSA after making the necessary findings.

#### § 1051.3 Place of filing.

A petition should be mailed to: Office of the Secretary, Consumer Product Safety Commission, Washington, DC 20207. Persons wishing to file a petition

in person may do so in the Office of the Secretary, at 4330 East West Highway, Bethesda, Maryland.

[48 FR 57123, Dec. 28, 1983, as amended at 62 FR 46667, Sept. 4, 1997]

#### § 1051.4 Time of filing.

For purposes of computing time periods under this part, a petition shall be considered filed when time-date stamped by the Office of the Secretary. A document is time-date stamped when it is received in the Office of the Secretary.

#### § 1051.5 Requirements and recommendations for petitions.

(a) *Requirements.* To be considered a petition under this part, any request to issue, amend or revoke a rule shall meet the requirements of this paragraph (a). A petition shall:

(1) Be written in the English language;

(2) Contain the name and address of the petitioner;

(3) Indicate the product (or products) regulated under the Consumer Product Safety Act or other statute the Commission administers for which a rule is sought or for which there is an existing rule sought to be modified or revoked. (If the petition regards a procedural or other rule not involving a specific product, the type of rule involved must be indicated.)

(4) Set forth facts which establish the claim that the issuance, amendment, or revocation of the rule is necessary (for example, such facts may include personal experience, medical, engineering or injury data; or a research study); and

(5) Contain an explicit request to initiate Commission rulemaking and set forth a brief description of the substance of the proposed rule or amendment or revocation thereof which it is claimed should be issued by the Commission. (A general request for regulatory action which does not reasonably specify the type of action requested shall not be sufficient for purposes of this subsection.)

(b) *Recommendations.* The Commission encourages the submission of as much information as possible related to the petition. Thus, to assist the Commission in its evaluation of a petition, to

## Consumer Product Safety Commission

§ 1051.3

the extent the information is known and available to the petitioner, the petitioner is encouraged to supply the following information or any other information relating to the petition. The petition will be considered by the Commission even if the petitioner is unable to supply the information recommended in this paragraph (b). However, as applicable, and to the extent possible, the petitioner is encouraged to:

(1) Describe the specific risks, of injury to which the petition is addressed, including the degree (severity) and the nature of the risk(s) of injury associated with the product and possible reasons for the existence of the risk of injury, for example, product defect, poor design, faulty workmanship, or intentional or unintentional misuse;

(2) State why a consumer product safety standard would not be feasible if the petition requests the issuance of a rule declaring the product to be a banned hazardous product; and

(3) Supply or reference any known documentation, engineering studies, technical studies, reports of injuries, medical findings, legal analyses, economic analyses and environmental impact analyses relating to the petition.

(c) *Procedural recommendations.* The following are procedural recommendations to help the Commission in its consideration of petitions. The Commission requests, but does not require, that a petition filed under this part:

1. Be typewritten.

2. Include the word "petition" in a heading preceding the text.

3. Specify what section of the statute administered by the Commission authorizes the requested rulemaking.

4. Include the telephone number of the petitioner, and

5. Be accompanied by at least five (5) copies of the petition.

### § 1051.5 Documents not considered petitions.

a. A document filed with the Commission which addresses a topic or involves a product outside the jurisdiction of the Commission will not be considered to be a petition. After consultation with the Office of the General Counsel, the Office of the Secretary, if appropriate, will forward to the appropriate

agency documents which address products or topics within the jurisdiction of other agencies. The Office of the Secretary shall notify the sender of the document that it has been forwarded to the appropriate agency.

b. Any other documents filed with the Office of the Secretary that are determined by the Office of the General Counsel not to be petitions shall be evaluated for possible staff action. The Office of the General Counsel shall notify the writer of the manner in which the Commission staff is treating the document. If the writer has indicated an intention to petition the Commission, the Office of the General Counsel shall inform the writer of the procedure to be followed for petitioning.

### § 1051.7 Statement in support of or in opposition to petitions: Duty of petitioners to remain apprised of developments regarding petitions.

a. Any person may file a statement with the Office of the Secretary in support of or in opposition to a petition prior to Commission action on the petition. Persons submitting statements in opposition to a petition are encouraged to provide copies of such statements to the petitioner.

b. It is the duty of the petitioner, or any person submitting a statement in support of or in opposition to a petition, to keep himself or herself apprised of developments regarding the petition. Information regarding the status of petitions is available from the Office of the Secretary of the Commission.

c. The Office of the Secretary shall send to the petitioner a copy of the staff briefing package on his or her petition at the same time the package is transmitted to the Commissioners for decision.

### § 1051.8 Public hearings on petitions.

a. The Commission may hold a public hearing or may conduct such investigation or proceeding, including a public meeting, as it seems appropriate to determine whether a petition should be granted.

b. If the Commission decides that a public hearing on a petition, or any portion thereof, would contribute to its determination of whether to grant or

deny the petition, it shall publish in the FEDERAL REGISTER a notice of a hearing on the petition and invite interested persons to submit their views through an oral or written presentation or both. The hearings shall be informal, nonadversary, legislative-type proceedings in accordance with 16 CFR part 1052.

**§ 1051.9 Factors the Commission considers in granting or denying petitions.**

(a) The major factors the Commission considers in deciding whether to grant or deny a petition regarding a product include the following items:

(1) Whether the product involved presents an unreasonable risk of injury.

(2) Whether a rule is reasonably necessary to eliminate or reduce the risk of injury.

(3) Whether failure of the Commission to initiate the rulemaking proceeding requested would unreasonably expose the petitioner or other consumers to the risk of injury which the petitioner alleges is presented by the product.

(4) Whether, in the case of a petition to declare a consumer product a "banned hazardous product" under section 8 of the CPSA, the product is being or will be distributed in commerce and whether a feasible consumer product safety standard would adequately protect the public from the unreasonable risk of injury associated with such product.

(b) In considering these factors, the Commission will treat as an important component of each one the relative priority of the risk of injury associated with the product about which the petition has been filed and the Commission's resources available for rulemaking activities with respect to that risk of injury. The CPSC Policy on Establishing Priorities for Commission Action, 16 CFR 1009.3, sets forth the criteria upon which Commission priorities are based.

**§ 1051.10 Granting petitions.**

(a) The Commission shall either grant or deny a petition within a reasonable time after it is filed, taking into account the resources available for processing the petition. The Com-

mission may also grant a petition in part or deny it in part. If the Commission grants a petition, it shall begin proceedings to issue, amend or revoke the rule under the appropriate provisions of the statutes under its administration. Beginning a proceeding means taking the first step in the rulemaking process (issuance of an advance notice of proposed rulemaking or a notice of proposed rulemaking, whichever is applicable).

(b) Granting a petition and beginning a proceeding does not necessarily mean that the Commission will issue, amend or revoke the rule as requested in the petition. The Commission must make a final decision as to the issuance, amendment, or revocation of a rule on the basis of all available relevant information developed in the course of the rulemaking proceeding. Should later information indicate that the action is unwarranted or not necessary, the Commission may terminate the proceeding.

**§ 1051.11 Denial of petitions.**

(a) If the Commission denies a petition it shall promptly notify the petitioner in writing of its reasons for such denial as required by the Administrative Procedure Act, 5 U.S.C. 555(e).

(b) If the Commission denies a petition, the petitioner (or another party) can refile the petition if the party can demonstrate that new or changed circumstances or additional information justify reconsideration by the Commission.

(c) A Commission denial of a petition shall not preclude the Commission from continuing to consider matters raised in the petition.

**PART 1052—PROCEDURAL REGULATIONS FOR INFORMAL ORAL PRESENTATIONS IN PROCEEDINGS BEFORE THE CONSUMER PRODUCT SAFETY COMMISSION**

Sec.

1052.1 Scope and purpose.

1052.2 Notice of opportunity for oral presentation.

1052.3 Conduct of oral presentation.

1052.4 Presiding officer; appointment, duties, powers.



Report to the  
U.S. Consumer Product Safety Commission  
by the

CHRONIC HAZARD ADVISORY PANEL  
ON DIISONONYL PHTHALATE (DINP)

June 2001

U.S. Consumer Product Safety Commission  
Directorate for Health Sciences  
Bethesda, MD 20814



Copy of case: page 106

**GREENPEACE**

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*DENIED POSSIBLE*  
*PG 77 79N*  
CPSA 6 (b)(1) Cleared  
*6/18/01*  
No Mfrs/PrvtLblrs or  
Products Identified  
\_\_\_\_ Excepted by \_\_\_\_  
\_\_\_\_ Firms Notified,  
Comments Processed.

June 6, 2001

Ms. Ann Brown, Chair  
U.S. Consumer Product Safety Commission  
Washington, D.C. 20207

Dear Ms. Brown,

We are writing this letter to petition the U.S. Consumer Product Safety Commission (CPSC) to expand the scope of a November 19, 1998 petition on polyvinyl chloride (PVC) plastic toys by Greenpeace and other groups to the U.S. Consumer Product Safety Commission 1. In that petition, we asked that your agency institute a ban on PVC plastic in all toys and other products intended for children five years of age and under. In addition, we urged that a national advisory be made on the health risks associated with soft PVC toys.

Given recent findings and developments discussed below, Greenpeace is calling upon the CPSC to broaden the scope of that 1998 petition to include all PVC products used in the home.

In March of this year, the European Union renewed its 1999 emergency ban on the use of six phthalates in PVC toys made for children under the age of three 2. Also since our 1998 petition, Greenpeace has conducted tests for phthalate plasticizers and organotin stabilizers in readily available PVC consumer products and home furnishings that children are likely to come into contact with in their daily lives. The results of the tests are presented in our May, 2001 report 3.

To summarize, the recent Greenpeace tests found that some of the highest levels of phthalates were found in products specifically designed for children's mouths. Other products contained the phthalate diethylhexyl phthalate (DEHP) significantly above the 3% voluntary cap set for pacifiers and teethingers. Although these products are not intended for children's mouths, some are very likely to be chewed by children. It was also discovered that diisononyl phthalate (DINP), an ill-defined chemical mixture often containing untested isomers, is used in teethingers at over 20% by weight of the product. With respect to their organotin content, all but one of the tested products contained detectable amounts. Some organotins cause nervous system damage and even death at high levels of exposure. PVC plastic is unique among all plastics due to the large quantity of toxic additives (plasticizers, stabilizers, etc.) required for its use in consumer products.

As you may recall, this problem first came to light in 1985 and 1986 when the toy industry agreed to limit the amount of one phthalate (DEHP) in PVC toys to less than 3% and again in 1996 when lead in PVC mini-blinds was found to unnecessarily put children

at risk because the lead was released to the surface of the blinds in the form of dust which children easily handled.

In light of new European regulations on phthalates in PVC products currently in place and the finding that a wide variety of vinyl products other than toys contain hazardous phthalates and organotins, Greenpeace is calling on the CPSC to take immediate action, whether by granting this petition or interim action. The CPSC should:

Immediately issue a warning in the Federal Register similar to its 1998 guidance for lead in consumer products. The warning should advise manufacturers, retailers and distributors and parents to end the unnecessary production, sale and use, respectively, of vinyl consumer products. The warning should not be limited to products designed for children.

Begin regulating vinyl (PVC plastics) as a hazardous material.

Prohibit the use of phthalates and organotins, in addition to lead, cadmium and other toxic or untested additives in all consumer products.

On behalf of the public, Greenpeace looks forward to the CPSC's timely response to this petition.

Sincerely,

Rick Hind  
Legislative Director,  
Greenpeace Toxics Campaign

Enclosures (3): 1. Greenpeace.1998. Petition to the Consumer Product Safety Commission.  
European Commission. 2001. Excerpt of March 5 Decision.  
Harmon. 2001. This Vinyl House: Hazardous Additives in Vinyl Consumer Products and Home Furnishings.

November 19, 1998

## PETITION

To the Consumer Product Safety Commission Concerning Phthalates and PVC in Children's Toys:

Whereas soft plastic vinyl --- polyvinyl chloride (PVC) --- requires the addition of chemical softeners and hard metal stabilizers that have been linked to potentially serious health effects;

- Whereas independent health studies have consistently found associations between DINP phthalate softeners in soft plastic vinyl (PVC) and liver and kidney damage;

Whereas a preliminary Consumer Product Safety Commission (CPSC) hazard assessment stated that DINP exposure was associated with <sup>3</sup>toxic effects in the liver, kidney, and other organs of mice and rats;<sup>2</sup>

Whereas CPSC's hazard assessment of DINP stated, <sup>3</sup>It is conceivable that one or more existing types of DINP for which data are unavailable could also be more toxic and/or carcinogenic;<sup>2</sup>

Whereas DINP phthalate is found in virtually every soft plastic vinyl (PVC) toy often at levels of 30 percent or more by weight;

Whereas four out of six studies reviewed by the European Union found levels of phthalate leaching that translated to daily exposure levels higher than the CPSC's <sup>3</sup>acceptable daily intake level;<sup>2</sup>

Whereas existing exposure studies likely understate the extent of exposure given that children mouth, bite, and swallow plastic much more aggressively than study simulations;

Whereas eight foreign countries have taken official action on phthalates including two bans (Austria, Denmark), one pending ban (Sweden), four requests for voluntary action (Belgium, Germany, Italy, Netherlands), and one national health advisory (Canada);

Whereas the attorneys general of 11 states are conducting a joint

investigation of lead and cadmium levels in soft plastic vinyl (PVC) toys;

Whereas lead may still be found in soft vinyl (PVC) toys after the CPSC urged its removal;

Whereas some U.S. toy manufacturers and retailers have not adequately addressed the problem by acting only on toys intended for the mouth;

Whereas infants and toddlers put all toys in their mouths;

Whereas alternatives to soft plastic vinyl (PVC) are commercially available and affordable;

Whereas an April 21, 1997, Presidential Executive Order states: <sup>3</sup>Each Federal agency shall ensure that its policies, programs, activities, and standards address disproportionate risks to children that result from environmental health risks or safety risks;<sup>2</sup>

The undersigned call on the Consumer Product Safety Commission to:

I. Institute an immediate ban on polyvinyl chloride (PVC) plastic in all toys and other products intended for children five years of age and under;

II. Issue a national advisory on the health risks that have been associated with soft plastic vinyl (PVC) toys to inform parents and consumers about the risks associated with PVC toys currently in stores and homes.

Children's Health Environmental Coalition  
Nancy Chuda, Director  
310-589-2233

Consumer Federation of America  
Mary Ellen Fise, General Counsel  
202-387-6121

Environmental Working Group  
Ed Hopkins, Vice President  
202-667-6982

Greenpeace USA  
Rick Hind, Legislative Director (Toxics Campaign)  
202-462-1177

Learning Disabilities Association  
Justine Maloney, Washington Representative  
703-243-2614

National Council of Catholic Women  
Sheila McCarron, Program Director  
202-682-0334

National Council of Jewish Women  
Sammie Moshenberg, Director (Washington Office)  
202-296-2588

National Environmental Trust  
Philip Clapp, President  
202-887-8800

Physicians for Social Responsibility  
Robert K. Musil, Ph.D.  
Executive Director  
202-898-0150

United Methodist Church (General Board of Church and Society)  
Jaydee Hanson,  
Assistant General Secretary  
202-488-5635

United Methodist Church  
(Women's Division)  
Pamela Spar, Executive Secretary  
292-488-5660

U.S. Public Interest Research Group  
Gene Karpinski, Executive Director  
202-546-9707

# 1. Environmental issues of PVC

A5-0092/200

1

**European Parliament resolution on the Commission Green Paper on environmental issues of PVC (COM(2000) 469 - C5-0633/2000 – 2000/2297(COS))**

*The European Parliament,*

- having regard to the Commission Green Paper (COM(2000) 469 - C5-0633/2000),
- having regard to Articles 174 and 95 of the EC Treaty,
- having regard to its resolution of 14 November 1996 on the communication from the Commission on the review of the Community strategy for waste management and the draft Council resolution on waste policy (COM(95) 399 – C4-0453/96)<sup>1</sup>,
- having regard to its resolution of 17 July 1997 on the Commission communication to the Council and the European Parliament on environmental agreements (COM(96) 561 – C4-0013/97)<sup>2</sup>,
- having regard to the responsibilities assumed by the Commission under European Parliament and Council Directive 2000/53/EC of 18 September 2000 on end of life vehicles<sup>3</sup>,
- having regard to the Community legislation in force on waste<sup>4</sup>, the landfill of waste<sup>5</sup> and the incineration of waste<sup>6</sup>,
- having regard to the Community legislation in force on restrictions on the marketing and use of certain dangerous substances and preparations<sup>7</sup> and on the classification, packaging and labelling of dangerous substances<sup>8</sup>,
- having regard to the forthcoming revision of the Community's chemicals policy,
- having regard to the forthcoming EU strategy on sustainable development,
- having regard to Rule 47(1) of its Rules of Procedure,

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<sup>1</sup> OJ C 362, 2.12.1996, p. 241.

<sup>2</sup> OJ C 286, 22.9.1997, p. 254.

<sup>3</sup> OJ L 269, 21.10.2000, p. 34.

<sup>4</sup> Council Directive 91/156/EEC of 18 March 1991, amending Directive 75/442/EEC on waste, OJ L 78, 26.3.1991, p. 32.

<sup>5</sup> Council Directive 1999/31/EC of 26 April 1999 on the landfill of waste, OJ L 182, 16.7.1999, p. 1.

<sup>6</sup> European Parliament and Council Directive 2000/76/EC on the incineration of waste of 4 December 2000, OJ L 332, 28.12.2000, p. 91.

<sup>7</sup> Council Directive 76/769/EEC of 27 July 1976, OJ L 262, 27.9.1976, p. 201.

<sup>8</sup> Council Directive 67/548/EEC of 27 June 1967, OJ 196, 16.8.1967, p. 1.



- having regard to the report of the Committee on the Environment, Public Health and Consumer Policy and the opinion of the Committee on Industry, External Trade, Research and Energy (A5- 0092/2001).
- A. whereas the Commission is asking Parliament to contribute to the debate on the environmental issues of PVC and in particular to the public consultation exercise with a view to the adoption of a comprehensive Community strategy on the environmental problems linked to PVC,
- B. whereas, as co-legislator in environmental protection and public health matters, the European Parliament has a moral obligation to participate in a constructive and ambitious way in the debate aimed at defining such a strategy,
- C. whereas Article 174(1) of the EC Treaty says that Community policy on the environment must contribute to pursuit, among other things, of the objectives of preserving, protecting and improving the quality of the environment and protecting human health; whereas paragraph 2 of that Article also stipulates that this policy is based on the precautionary principle and on the principles that preventive action should be taken, that environmental damage should, as a priority, be rectified at source and that the polluter should pay; whereas, however, consideration must be given to the social, employment, financial and economic implications of any proposed policy,
- D. whereas in its abovementioned resolution of 14 November 1996 the European Parliament called for a reduction of PVC, chlorine and heavy metals in waste,
- E. whereas the Council resolution of 24 February 1997 on waste policy<sup>1</sup> called for increased efforts to reduce the presence of dangerous substances in waste where less dangerous alternatives are available,
- F. whereas the management of PVC waste requires special attention on account of the specific characteristics of this material and in particular on account of its high chlorine content, but whereas in order to tackle this problem effectively, measures relating to PVC must not preclude the formulation of a more general strategy for dealing with all plastics,
- G. whereas the Commission's Green Paper focuses mainly on an analysis of the environmental impact of PVC in terms of waste management, without analysing all aspects of PVC products throughout their life cycle and without considering the economic advantages and disadvantages of this material; whereas the Green Paper also raises questions about waste collection and management which relate to all materials and not specifically to PVC and whereas the Green Paper does not compare PVC with alternative materials,
- H. having regard to the specific nature of the European PVC processing industry, which is essentially made up of small and medium-sized enterprises, and therefore that SME impact studies are an essential prerequisite of implementing any new legislation,

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<sup>1</sup> OJ C 76, 11.3.1997, p. 1.

- I. whereas the use of stabilisers such as lead, cadmium or organotins in PVC products poses potential risks of dispersion into the environment during production, processing and disposal of PVC and, consequently, risks to human health,
- J. noting the recent widespread public fears about the use of phthalates in products intended for children and at the same time the need to await the findings of the current risk evaluation,
- K. whereas the results of the current risk assessments are important but must not preclude immediate measures for particularly exposed groups; whereas there is also a lacuna in the programme for existing substances, where total exposure to phthalates is not assessed.
- L. having regard to the voluntary commitment given by the European PVC industry in March 2000 to contribute to the reduction of the environmental impact of PVC throughout its lifecycle,
- M. whereas it is necessary to tackle the problems relating to management of waste PVC within the more general framework of an enhanced European strategy for waste disposal,
- N. whereas in the case of all methods of processing PVC, the aims pursued should be not only to keep emissions of pollutants to a minimum but also to minimise quantities of residues,
- O. whereas in the past insufficient emphasis has been placed on developing recycling of PVC, including melting for reuse, although technical solutions are at the development stage,
- P. whereas the percentage of pre-consumer PVC waste currently recycled is about 80%, while that of post-consumer PVC is only around 3% of annual sales and this method of waste treatment is also basically limited to sectoral applications such as pipe systems, sections for use in building, and roofing membranes, and a few schemes for cable, packaging and floor-covering waste,
- Q. whereas the proportion of PVC recycled must therefore be increased,
- R. whereas recycling of PVC must not perpetuate the problem of heavy metals,
- S. whereas the first step should be to recycle bulk PVC waste (such as pipe systems, tubes, sections for use in building, window frames, roofing membranes and other PVC waste from the building trade), as large quantities are involved and they can be collected more readily,
- T. whereas the incineration of PVC products gives rise to the emission of hazardous substances such as hydrogen chloride (HCl), which then have to be neutralised to comply with the limits imposed by existing legislation and thus gives rise to waste classified as hazardous in quantities which can exceed the quantities that went into incineration and the emission of heavy metals such as cadmium, which is very difficult to combat because of the volatility of the metal,

- U. whereas the gradual commissioning of new generation incinerators will make it possible to reduce the quantity of emissions from hazardous waste, but the quantity of residues should be kept to a minimum,
  - V. whereas landfill is currently the most common method of disposing of PVC waste.
  - W. whereas the environment should be free from man-made or extracted substances and metals that represent a threat to health or biological diversity,
  - X. whereas it is well known that PVC softeners will be released from PVC waste during landfill,
1. Welcomes the Commission's initiative of launching a large-scale public consultation exercise on the environmental impact of PVC in order to identify practical solutions to the problems posed by the use of such materials for the environment and human health;
  2. Regrets, however, that the Commission has not performed any lifecycle analysis of PVC products to compare them with alternative materials and calls on the Commission to ensure that the lifecycle impact on health and the environment of alternative products which are substitutes for PVC is assessed with at least the same degree of precision and openness as that of PVC;
  3. Considers that scientific research into the industrial, economic and environmental implications of PVC and of any potential reformulations or substitutes (PET, aluminium, wood, etc.) could be valid items for the Sixth Framework Research Programme;
  4. Calls on the Commission to bring forward as soon as possible a draft long-term horizontal strategy which would allow substitution policies to be introduced based on a comparative analysis of alternative products throughout their lifecycle for various categories of products including, in particular, products directly linked to human health, disposable products and products that are difficult to separate;
  5. Calls on the Commission to introduce rapidly a policy on the replacement of soft PVC, in so far as the current risk analysis of phthalates indicates that it is desirable to reduce the exposure of people and the environment;
  6. Calls on the Commission to issue a recommendation to the Member States calling on them not to use PVC as a building material in buildings with a high fire risk;
  7. Calls on the Commission to back up its forthcoming proposals on the future of the PVC industry with a proper evaluation of the socio-economic impact, which examines in particular the effects on employment in quantitative and qualitative terms, especially with regard to SMEs;
  8. Calls on the Commission, in the discussions concerning the future of the PVC industry, to arrange for appropriate participation by European works councils, other bodies representing employees from the PVC industry and health, consumer and environmental NGOs, particularly where health, safety and environmental interests are at stake;

9. Calls on the Commission to include the applicant countries in the strategy and ensure that European Union standards are introduced and applied there;

### ***Waste collection***

10. Draws attention to the importance of more effective differentiated waste collection which allows different waste streams to be sent to the most appropriate disposal sites;
11. Calls on the Commission in addition to propose appropriate measures to ensure separate collection of PVC products, due to the problems they create in each waste disposal option, in particular incineration;
12. Considers that, in order to meet significant quantitative objectives in terms of waste collection, it is necessary to establish a specific legal framework that encourages the drawing up of agreements involving all interested parties;
13. Calls on the Commission therefore to examine existing good practices at Community and Member State level with regard to voluntary commitments by the industry and environmental agreements and subsequently to propose, on the basis of that analysis, legislation to encourage the attainment of ambitious objectives;

### ***Additives***

14. Considers that the commitments given by the PVC industry, although interesting and commendable, are not sufficient to prevent the dispersion of hazardous substances, such as cadmium and lead, into the environment, and particularly at the work place; considers that more thorough studies should therefore be carried out with the aim of ensuring full protection of public health and assessing precisely the impact of the dispersion of these substances;
15. Considers, consequently, that it is necessary to adopt Community legislation designed to phase out cadmium and lead-based stabilisers and to ban imports from non-member countries of PVC products containing these substances;
16. Calls on the Commission to propose amendments to Directive 76/769/EEC with the aim of banning all use of lead and cadmium as a stabiliser in the PVC industry;
17. Calls on the Commission to perform a risk assessment of possible substitutes for stabilisers and additives;
18. Calls on the Commission to examine alternatives to the use of phthalates as plasticisers, which present less risk to human health;
19. Suggests that the Commission and the PVC industry, taking also into account the current studies, should look into the possibility of setting targets for reducing the use of phthalates, particularly in medical equipment;

### ***Management of PVC waste***

#### ***Recycling***

20. Considers that it is necessary to continue to develop technological research, primarily in the area of chemical recycling that can separate chlorine from heavy metals, provided that strict emission standards are applied, to reduce the costs of the process and improve its effectiveness, with a view to increasing the percentage of PVC waste recycled and to reducing the percentage of waste for incineration or dumping;
21. Suggests that, on the model of the end-of-life vehicles Directive, the proportion of recycled waste be increased, giving priority to the sectors where recycling does not perpetuate the problem of heavy metals, and that of waste for incineration or dumping consequently reduced, by making the producers at least partially responsible for the product life cycle through the introduction, starting with long-life products, of 'closed cycles' recovery systems;
22. Proposes the introduction of compulsory marking of all plastics to facilitate collection and sorting of PVC applications and asks the Commission to support the development of existing technologies which identify and mechanically separate the different kinds of plastic;
23. Calls on the Commission to examine the possibility of providing incentives for the use of recycled material giving priority to bulk PVC waste (such as pipe systems, tubes, sections for use in building, window frames, roofing membranes and other PVC waste from the building trade);
24. Considers that the task of defining precise objectives at Community level is a matter for the legislator, which cannot therefore be left to the goodwill of the industry within the framework of the voluntary commitment;
25. Calls on the Commission to present as soon as possible a proposal for framework legislation on environmental agreements, which lays down the relevant criteria with regard to conditions, monitoring arrangements and penalties;
26. Considers that, pending the adoption of such framework legislation, an alternative solution would be the adoption, in accordance with the procedures laid down by the Treaties, of legislation defining precise objectives for the recovery of waste, established in agreement with producers, monitoring arrangements and implementing rules and which would enter into force only if operators in the sector are unable to meet the stipulated objectives through voluntary commitments;

#### *Incineration*

27. Considers it essential to support research and the development of new technologies allowing the recovery of hydrogen chloride and thereby improving the impact of incineration on the environment and human health, as well as reducing to a minimum other emissions and the quantity of residues;
28. Stresses that there is a substantial difference between soft and hard PVC and it is therefore important to separate their waste as early as possible, with a view to directing hard PVC waste as a priority towards recycling or landfill and soft PVC waste towards incineration.

which, due to the lower chlorine content in soft PVC, is potentially less dangerous than landfill where there are risks of losses of plasticisers, especially phthalates:

29. Supports, in accordance with the hierarchy of principles established by the European waste management strategy, the option of incineration with energy recovery;
30. Proposes that the 'polluter pays' principle be applied in full, thereby charging producers for part of the additional costs incurred because of the presence of PVC in incinerated waste, and proposes that this approach be extended to the processing of other types of waste which entail extra costs;

#### *Landfill*

31. Notes that neither incineration nor landfill is a sustainable option for management of waste PVC; only separate storage of hard PVC can be regarded as a temporary solution in this connection, pending increases in recycling capacity;
32. Calls on the Commission to evaluate all available studies of the long-term behaviour of PVC at dumps in order to be able to judge whether it is safe;

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33. Instructs its President to forward this resolution to the Council and Commission.



# THIS HAZARDOUS VINYL CONCENTRATION HOUSE

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**GREENPEACE**

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## Summary

Greenpeace tested a variety of common polyvinyl chloride (PVC or vinyl) consumer products, with uses from childcare to home furnishing, for phthalate plasticizers and lead, cadmium and organotin stabilizers. In earlier investigations, we detected the presence of hazardous levels of phthalates and cadmium and lead in toys and other PVC products manufactured for children. Toys, however, represent only a small part of the PVC market. On the other hand, construction materials including home furnishings, from hard (e.g., window frames, pipes) to softened (e.g., floor and wall coverings, accessories) products, account for 76% of PVC use. Although the most direct exposure of children to hazardous additives may be expected from toys and childcare items, the wide variety of other vinyl products in the home may also act as significant sources of exposure. Greenpeace therefore expanded its investigations to include materials in the home made of vinyl, such as wallpaper and floor coverings, that children come into contact with on a daily basis.

In this study, we found that:

- All products tested contained detectable levels of phthalates, with a maximum of 39% by weight in a drinking straw. Indeed, some of the highest levels were found in products specifically designed for children's mouths.
- Virtually all of the products contained significant amounts of organotins. Floor tiles, on which children spend a lot of time crawling and playing, and wallpa-

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per were the two products containing the highest levels.

- Vinyl products for everyday use, containing larger amounts of hazardous additives than any other plastic, can be readily purchased at popular retail stores in the United States.

Greenpeace is concerned about this widespread availability of vinyl products containing substantial levels of phthalates and organotins since these additives leach from PVC and are untested and/or are associated with a number of serious health effects in animals.

With respect to phthalate plasticizers, scientific studies have shown that:

- Humans have phthalates in our bodies. A recent Centers for Disease Control (CDC) study confirmed the presence of two of the phthalates detected in this study in a test population.
- The offspring of rats fed the three phthalates detected in this study, namely diethyl hexyl-, diisononyl- and benzyl butyl phthalate (DEHP, DINP and BBP, respectively), do not follow normal patterns of sexual development.
- There is reason for concern that DEHP may impair male reproductive system development in human infants and toddlers.
- DINP causes liver tumors and damages the kidneys in rodents.
- The amount of DINP and other phthalates that leach from a product does not always correlate with the amount the product contains.

- DEHP-exposed rats and mice have a higher propensity for liver cancer than non-exposed animals. Furthermore, the Environmental Protection Agency (EPA) and the Department of Health and Human Services (DHHS) consider DEHP to be a probable human carcinogen. That is to say, DEHP may reasonably be considered a cancer causing substance in people.

In the case of metal stabilizers, it is scientifically accepted that:

- Breathing or swallowing organotins can interfere with the nervous system, and even cause death at high levels of exposure.
- Organotins have adverse effects on marine wildlife and rats, including reduced reproduction and developmental problems.
- Organotins build up in the fat of fish, rats and mice.

Greenpeace considers the use of phthalate plasticizers and metal stabilizers in common PVC consumer products unacceptable since it results in our needless and avoidable exposure to hazardous substances - exposure about which most people remain unaware. PVC requires more additives than any other plastic. Eighty-six percent of all phthalates made are used as PVC additives, and that number is expected to climb. It has also been estimated that almost 70% of all organotins are devoted for use in PVC. Clearly, if we replaced PVC with alternate materials that already exist, our direct exposure to phthalates and organotins would drop dramatically.

PVC's need for chemical additives is only part of its hazard - its lifecycle has serious, negative consequences. Dioxin is a confirmed human carcinogen (cancer-causing substance), and one of the most potent toxins known to man. Together, PVC manufacture and disposal represent one of the largest sources of dioxin. For these reasons, Greenpeace advocates the phase-out of all PVC plastics.



This Graco stroller raincover contains DEHP, a phthalate that some manufacturers have voluntarily removed from their products.

## Introduction

### Reasons for conducting this study

The global production of vinyl (also called PVC or polyvinyl chloride) was last estimated at approximately 51 billion pounds per year. (Stringer 2001) PVC takes many forms, being used to produce anything from food wrap, medical devices and children's toys to construction materials. To play all of these roles however, PVC must be mixed with additives since it is a hard, brittle plastic if left untreated. Chemicals known as phthalates are the most commonly used to plasticize PVC. (Bizarri 1996) These chemicals are characteristically oily liquids that soften, but do not bind to PVC when mixed. Because phthalates do not form tight bonds with PVC, they are able to leach out of vinyl products during normal use and after disposal. (Cadogan 1993)

Fueled by the hazards of PVC additives, Greenpeace undertook a study to determine the amount of phthalates present in vinyl products designed for a potentially sensitive and vulnerable population, namely children. That 1997 investigation found up to 40% by weight of phthalates, primarily diisononyl phthalate (DINP), in toys bought in 17 countries from around the world. (Stringer 2000) Toys, however, represent only a small percentage of the PVC market. Construction materials on the other hand, including vinyl siding, pipes, home furnishings and accessories, account for 76% of PVC use. (Chemical Economics Handbook 1997) Greenpeace, therefore, undertook this study of a wider assortment of vinyl products, including

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wallpaper, floor coverings and childcare items that children are likely to come into contact with in their everyday lives. The descriptions of the products are shown in Table 1 (page 17).

Phthalate plasticizers are only one class of additives that PVC requires. Without additives, PVC is not only brittle but it is also relatively unstable. Stabilizers, often metals, are added to PVC to keep it from breaking down and to give it stability against heat. (DiGangi 1997) Lead and cadmium were widely used for these purposes, but regulations brought on by their known human health hazards have forced manufacturers to replace them with other metals in some products. Organotins have long been used in commerce (Sadiki 1996) and as such, they made attractive candidates for replacements of the known hazardous stabilizers. However, the increased use of organotins as PVC stabilizers does not mean that they have a 'clean bill of health.' In fact, evidence is mounting against them. In the face of emerging reports that organotins also leach from PVC (Sadiki 1999) and are hazardous to humans (Boyer 1989, Champ 2000, ASTDR 1992), Greenpeace also tested the products included in this study for their organotin content. We did not test the leaching of either phthalates or organotins from PVC since it is already established to occur. (Cadogan 1993, Sadiki 1999) Furthermore, leaching rates are dependent upon a variety of factors such as heat, age of the product and friction. (DiGangi 1997)



This Gerber diaper cover and The First Years changing mat contained significant levels of one phthalate, DINP. In addition, the changing mat contained organotins and bisphenol A.

### Routes of human intake of phthalates

A recent study released by the CDC confirmed that humans have certain phthalates in our bodies. (U.S. CDC 2001) Eating, breathing and skin contact, as well as transfusion, are all ways, either together or alone, that different phthalates make their way into our systems. According to the EPA, eating is probably the main route by which humans are contaminated with diethylhexyl phthalate (DEHP), the most widely used phthalate plasticizer. (U.S. ASTDR 1993) In the same way, we are contaminated with other commonly used phthalates such as diisononyl phthalate (DINP). (Opinion on Phthalate migration 1998, U.S. CPSC 1998a) Children may take in higher than

average amounts because their chew toys are made of highly phthalate-softened PVC (e.g., teethingers). Indeed, the highest levels of DINP released from teethingers and toys exceeded the acceptable daily intake level in studies, conducted in the Netherlands and Denmark, that simulated children's mouthing behavior. (Opinion on Phthalate migration 1998, U.S. CPSC 1998b) Furthermore, a Dutch study confirmed what most of us have observed - children suck or chew their fingers and other things that are not intended to go into their mouths more than chew toys. (Groot 1998) This unintended chewing undoubtedly adds to their overall intake of phthalates.

Transfusion is another route of human phthalate exposure. Phthalates leach from PVC medical devices into solutions that are then fed into the patient. (Rossi 2000, Tickner 1999) People who are ill, especially children whose systems are still developing, may be particularly sensitive to this type of exposure. Concerns have in fact been raised that the developing, but not mature, male genital tract in humans may be adversely affected by high levels of DEHP. (U.S. National Toxicology Program 2001)

Breathing in air and dust containing phthalates that have off-gassed from PVC flooring also adds to the amount of phthalates in our systems. (Cadogan 1993, Rossi 2000) Again, this is of particular concern with respect to children since they spend a lot of time indoors with a breathing range close to the floor.

Although uptake of phthalates through

skin contact with PVC would not be expected to play a large role in human contamination, it should be considered when thinking about our cumulative phthalate intake. This is particularly true for children who touch PVC products and then put their fingers into their mouths.

### **Regulations on phthalate use**

Prompted by the potential of babies to intake dangerous amounts of phthalates and the serious, negative health effects they cause in animal studies, the European Union placed an emergency ban on the use of certain phthalates in toys made for children under the age of three in 1999. (Official Journal of European Communities 1999) This emergency ban was recently renewed for the fifth time. (European Commission 2001) In the United States, the Consumer Product Safety Commission (CPSC) and the Toy Manufacturers of America (TMA) agreed upon a voluntary limit of DEHP at 3% in pacifiers and teethingers in 1986. (TMA 1986) Later in 1998, the CPSC responded to Greenpeace calls and asked toy manufacturers to voluntarily withdraw PVC teething rings and rattles containing DINP from the market. (U.S. CPSC 1998c) However, such agreements do not stop the use of, and children's exposure to, hazardous or untested additives. DINP is a poorly defined mix of as many 100 chemical variants, and the CPSC states that the composition of DINP in children's products is unknown and was unknown in 1986 when the toy industry began using it after concerns about DEHP came to light. (U.S. CPSC 1998b) In addition, the CPSC states that, "It is conceiv-

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able that one or more existing types of DINP for which data are unavailable could also be more toxic and/or carcinogenic," than the types of DINP that have been tested. (U.S. CPSC 1998b)

Regulations are also in place for phthalates in plastics that come into contact with food such as during its processing, transportation and storage. The Food and Drug Administration (FDA) states that butyl benzyl phthalate (BBP) and diisononyl phthalate (DINP) "may be safely used" at levels up to 1% and 43%, respectively. (U.S. FDA 21CFR178.3740 2000) Closer inspection reveals legislative provisions that are very likely to be broken. For example, the regulation states that the plastics should be used "at temperatures not exceeding room temperature." (U.S. FDA 21CFR178.3740 2000) That suggests that eating food from a plastic container at a summer picnic, or warming food wrapped in plastic in a microwave may be considered unsafe. Worse still is that plastic products are often unmarked, leaving consumers unable to make informed decisions.

### **Routes of human intake of organotins**

Ingestion and inhalation represent the major ways by which we take in organotins, although skin contact may also be a route of contamination. (U.S. ASTDR 1992)

Canadian studies have shown organotins in water from PVC pipes containing organotin stabilizers. (Sadiki 1999) Clearly, drinking tainted water is a route

that organotins can make their way into our bodies. In addition, organotins in the environment build up in the fat of fish. (Boyer 1989, U.S. EPA 2001) By eating these fish, we again introduce organotins into our systems.

Because organotins are found in dust (Santillo 2001), perhaps due to their release from plastics and other textiles, breathing is another way that humans are contaminated by organotins. This and previous research conducted by Greenpeace and the Healthy Flooring Network in the United Kingdom confirmed the presence of organotins in vinyl flooring, carpets and wallpaper. (Allsopp 2001, Allsopp 2000)

Although it is not clear whether skin contact with PVC containing organotins adversely affects our health, workers exposed to paint containing tributyltin, or TBT, developed skin inflammation among other symptoms. (Boyer 1989, Champ 2000, U.S. ASTDR 1992)

### **Regulations on organotin use**

Traditionally, organotins are used as anti-fouling agents in paint applied to ships to keep the growth of algae and other marine life to a minimum. (Champ 2000) Although organotins are very effective at this task, marine life has unfortunately suffered as a result. In response to this threat, the U.S. Congress made organotins the only chemicals to have exclusive environmental legislation. (Champ 2000) The Organotin Antifouling Paint Act of 1988 prohibits the use of paint containing organotins on water vessels shorter than

twenty-five meters. The Act also prohibits the sale of paint containing organotins not certified by the EPA. (Champ 2000) Other countries have even more stringent regulations in effect. Both Austria and Switzerland have banned all use of TBT paints on vessels in freshwater. (Champ 2000) Germany, in addition to having similar restrictions to those in the United States, has regulations that limit TBT to 3.8% in paint and that require organotin-containing paint to be safely disposed. (Champ 2000)

The threat of organotins in products besides paint has also been recognized. In the United States, the FDA limits certain organotins to 3% in plastics that contact food (U.S. FDA 21CFR178.2650 2000). The organotin air limit set by the Occupational Safety and Health Administration (OSHA) is 0.1 milligrams/cubic meter. (U.S. ASTDR 1992) Depending upon the organotin, this number translates to 0.000002% at the very most.

## Findings

### All PVC products tested contain detectable levels of phthalates

Twenty common, vinyl consumer products were tested for phthalate plasticizers, and the results of the tests are summarized in Table 1 (page 17). They show that diethylhexyl phthalate (DEHP), diisononyl phthalate (DINP) and butyl benzyl phthalate (BBP) are found in childcare products and vinyl home furnishings that children come into contact with in their daily lives. Taken together,

the results reveal that:

- All products tested contained detectable levels of phthalates, with a maximum of 39% by weight in a straw from a child's drinking cup. Indeed, some of the highest levels were found in products specifically designed for children's mouths.
- Seven out of 20 products contained DEHP above a 3% voluntary cap set for pacifiers and teethingers. Some of these products, although not intended for children's mouths, are very likely to be chewed by children.
- Two teethingers contained over 20% by weight DINP.
- BBP is found in home furnishings at concentrations up to 1.7% by weight. A 1% limit on BBP in plastic that contacts food is currently in effect in the U.S.
- Vinyl products for everyday children's use containing hazardous levels of phthalates can be readily purchased at popular retail stores throughout the United States.

In 1999, the European Union approved an emergency ban on the use of six phthalates in toys made for children under the age of three. (Official Journal of European Communities 1999) That emergency ban was recently extended for the fifth time. (European Commission 2001) In the United States however, a voluntary limit of 3% DEHP is the only recommendation on phthalate use in pacifiers and teethingers. This inadequate regulation does not stop the use of high levels of phthalates besides DEHP in

teethers, as illustrated by the over 20% DINP content that we found in teethers tested in this study.



Clothing for children, such as these sandals and winter hat tested by Greenpeace, is often made of vinyl.

The home furnishings we tested had an overall lower phthalate content than the children's products, although a carpet protector did contain phthalates up to 24.7% by weight. This result should not be taken to suggest that products for the home do not act as significant sources of chemical exposure to children. Because wallpaper and floor tiles are not designed to be as soft and flexible as chewable toys, they do not require as large amounts of phthalates. However, they

have other requirements that products such as teethers do not, namely considerable stability against heat and decomposition. For these reasons, they would be expected to contain high levels of metal stabilizers, and the results of this study confirm that to be the case.

Although the chemical additive bisphenol A was not a focus of this study, it was also detected in two of the 20 items we tested. Bisphenol A is used in glue production, and can be found in a wide variety of products ranging from car parts to drinking bottles. (WWF 2000) It is also used in PVC production and processing, and similar to phthalates, bisphenol A is known to leach from plastic and other materials and subsequently contaminate humans. (ADA 1998, WWF 2000)

Leaching of bisphenol A from dental sealants at 5 ppb (parts per billion) prompted the American Dental Association to contact the manufacturer of the sealant to change its manufacturing process. (ADA 1998) In this study, bisphenol A was detected at 139,000 ppb in a Safety 1st Deluxe RollerShade sun-screen carblind from Toys R Us, and at 142,000 ppb in a changing pad made by The First Years bought at Target. This is of concern since bisphenol A affects the hormone system, and causes toxic effects such as reduced sperm production and increased prostate, kidney and liver weights in some animals. (U.S. National Toxicology Program 2000, WWF 2000)

(See Table, page 17)



### **Metal stabilizers detected in all but one product tested**

All 20 PVC items in this study were tested for lead and cadmium stabilizers, whereas just 15 were tested for organotins. Five items were eliminated from the organotin tests based upon the high cost of the procedure and the fact that a similar item was being tested. The results of the metal tests are shown in Table 1 (page 17). They reveal that:

- Fourteen out of 15 products contained detectable amounts of organotins. Floor tiles, on which children spend a lot of time crawling and playing, and wallpaper were the two products containing the highest levels.
- Two of the products tested contained cadmium in amounts exceeding the California Proposition 65 regulated level.
- Eleven of the products tested contained lead above the detection limit, although none at levels exceeding the regulated limit for vinyl. (DiGangi 1997)

Current limits of organotins in air set by OSHA do not exceed 20 ppb (parts per billion). (U.S. ASTDR 1992) Our results show that a wallpaper sample contained 776,508 ppb total organotins. It is alarming that a product containing that amount of organotins is readily available given the lack of information about organotins being released from PVC products by off-gassing and normal wear and tear. In 1988, the Washington State Department of Health issued an advisory against the use of tributyltin (TBT) in interior paint since it released into the air and caused

illness in humans. (Epidemiologic Notes and Reports 1991) In addition, organotins were found in the dusts from parliament buildings in Europe, a clear demonstration that organotins are found in our daily environment. (Santillo 2001) This study confirmed the presence of organotins in vinyl floor tiles and wallpaper. Earlier work by Greenpeace also found significant quantities of organotins in vinyl flooring in addition to carpets. (Allsopp 2001, Allsopp 2000) A possible route by which they make their way into the air we breathe is through off-gassing from PVC building materials and other organotin-containing textiles.

### **Discussion**

In this report, we have demonstrated that widely used PVC products, including children's items, wallpaper and floor coverings, contain high levels of hazardous additives. These additives, namely phthalate plasticizers and metal stabilizers, are needed to soften PVC and to keep it from degrading. (Bizarri 1996, DiGangi 1997) Diethylhexyl phthalate (DEHP), diisobutyl phthalate (DINP) and butyl benzyl phthalate (BBP), were detected in the products tested in this study at combined levels up to 39% by weight of the product. The metal stabilizers lead and cadmium were also found in some of the products, but organotins were present in all but one of the items, often at high concentrations. Concerns surrounding the use of phthalate and organotin additives in commonly used PVC products are discussed below.

### Humans are contaminated with phthalates

A recent study conducted by the CDC confirmed that we have phthalates in our bodies. (U.S. CDC 2001) Levels of the metabolites, or breakdown products, of seven phthalates were found in the urine of at least 1,020 people ages six and above. With respect to the phthalates detected in our work, the CDC study confirmed the presence of DEHP and BBP metabolites in human urine. Conversely, DINP metabolites were not found in that study. This may simply reflect, however, the difficulty in identifying DINP breakdown products since DINP is a complex mixture of as many as 160 isomers, or chemical variants.

The observation that the metabolites of BBP and diethyl-, and dibutyl phthalate (DEP and DBP) were detected in urine at a higher concentration than DEHP metabolites does not necessarily mean that human contamination by DEHP is lower than that of BBP, DBP or DEP. Alternatively, the results may reflect differences in the efficiency with which different phthalates are metabolized. In a study comparing the metabolism of the same amount of DEHP and DBP, 80% of DBP was metabolized versus only 20% of DEHP under the same conditions. (Kluwe 1982) However the results are interpreted, they clearly show that humans are contaminated with DEHP, BBP, DBP and DEP.

### Routes of human intake of phthalates

As discussed earlier, children may take in particularly high levels of phthalates from teethingers and other childcare items made of highly phthalate-softened PVC. In this study, a Prince Lionheart crib rail teether purchased at Babies R Us, and a hand-held General Mills Cheerios teether from the Burlington Coat Factory containing 20.8% and 21.7% DEHP by weight, respectively serve as good examples. Other items in this study that could very likely be chewed by youngsters include a child's hat and a Liz Claiborne handbag. These products are made up of over 20% DEHP.

Children may also intake more phthalates than adults through breathing. An initial study conducted in Norway reported a higher incidence of bronchial obstruction in children living in houses with PVC, as opposed to wooden floors. (Ailsopp 2000, Jaakola 1999) Phthalates being released into the air could provide a possible link between these two observations since phthalates are known to leach from PVC into the surrounding air. (Cadogan 1993, Rossi 2000) Off-gassing of DEHP from vinyl flooring can result in exposure levels that exceed the highest estimates of our daily intake by almost three times. (Rossi 2000) In this study, a Tenex carpet protector was determined to be 24.7% by weight DEHP, indicating that we can be exposed to phthalates in our homes and offices through everyday activity. This is of more concern with respect to children since they spend a lot of time indoors with a breathing range closer to the floor than adults. In addition, children may

ingest phthalates by coming into contact with home furnishings since they are very likely to crawl on PVC flooring, for example, and then put their fingers into their mouths.

### **Toxic effects associated with phthalates**

The offspring of rats fed the three phthalates detected in the products Greenpeace tested here, namely DEHP, DINP and BBP do not follow normal patterns of sexual development. (Gray 2000) In the case of DEHP-fed and BBP-fed rats, the weight of the offspring was also reduced. Other studies also report subtle effects of DEHP in the testes of young rats at levels below the accepted no-observed-adverse-effect level (NOAEL). (Gray 2000) Recently, the National Toxicology Program (NTP) expressed concern over the adverse development of babies born to pregnant women who take in DEHP at the exposure levels estimated for an adult. (U.S. National Toxicology Program 2001) They also expressed concern that male infants and toddlers who substantially exceed adult DEHP exposure estimates could suffer problems in their reproductive system development.

Rats and mice fed DEHP and DINP also showed an increase in liver cancers over animals that had not been fed DEHP. (U.S. ASTDR 1993, U.S. CPSC 1998c) Furthermore, DEHP has been classified as a "probable human carcinogen" by the EPA. The Department of Health and Human Services has also classified DEHP as a potential carcinogen. (U.S. ASTDR

1993) That is to say, DEHP may reasonably be considered a cancer causing substance in humans. A retrospective study conducted in Sweden found an increase in testicular cancer in workers who were exposed to PVC (Ohlson 2000), although additional studies are needed to determine whether phthalates are responsible.



Small children chew on everything. It is part of their learning process!

### Routes of human intake of organotins

Ingestion of organotin-tainted foods and drink, and inhalation of organotin-laden dust are the main ways that humans become contaminated with these metal stabilizers. (U.S. ASTDR 1992) Tests of drinking water found organotins in water from PVC pipes, but not in water from polyethylene pipes. (Sadiki 1999, Sadiki 1996) This finding demonstrates that organotins leach from PVC, and points out a source of our exposure. Organotins are also used as stabilizers in PVC plastics used to protect food. (Kawamura 2000) Similar to the phthalate plasticizers, it is conceivable that they make their way

from plastic containers and wraps into food we subsequently eat.

Although not from a PVC source, yet another way organotins make their way into our diets is through leaching from paint on marine vessels and building up in the fat of fish that we eat. (Boyer 1989, Champ 2000, Jacobson 2000, U.S. EPA 2001)

A recent study found organotins in dusts collected from parliament buildings in Europe. (Santillo 2001) This finding provides us with clear evidence that organotins have made their way into our environment, perhaps from organotin-containing textiles, and also a better understanding of where we might be exposed.



*This Prince Lionheart crib rail teether contained over 20% phthalates.*

### Concerns about organotin stabilizers

Organotins, especially tributyltin (TBT), are most widely recognized for their use as anti-foulants in the paint on marine vessels. (Champ 2000, Jacobson 2000) Fouling is the growth of marine life including bacteria, fungus, barnacles and algae on boats. While organotins are very effective as anti-fouling agents, they cause adverse effects on the environment by leaching from ships into the water where they can remain for several months. Organotins also concentrate in sediments where they have a half-life of over 20 months. (Jacobson 2000, U.S. EPA 2001) Concentrations of TBT as low as 1 parts per trillion (ppt), or 0.0000000001%, have been associated with reduced reproduction in snails (U.S. EPA 2001), and TBT at 7 ppt causes malformations in oysters (Jacobson 2000). Organotins also cause rats and mice to have problems with reproduction and the birth of normal offspring. (Kergosian 1998, U.S. ASTDR 1992) In humans, shipyard workers exposed to TBT-containing paint developed symptoms such as breathing problems, chronic skin inflammation, dizziness and a weakened ability to ward off colds and flu. (Champ 2000)

### Recommendations

In this study, we have shown the presence of hazardous phthalate plasticizers and organotin stabilizers in common PVC consumer products. Earlier Greenpeace investigations of phthalates (Stringer 2000) and cadmium and lead (DiGangi 1997) in toys and other children's items identified products that expose children

to hazardous PVC additives. In this study, we have extended the list to include childcare products and other materials used for decorating around the home.

Although debate still remains surrounding the hazards that PVC additives pose to human health, we advocate using precaution in assessing chemicals for their use in commerce especially where safe alternatives that do not require additives exist. Unequivocal scientific proof that a given chemical causes a particular effect should not be necessary to start the regulatory process to remove hazardous chemicals from consumer products in order to avoid long-term or irreversible harm.

Inadequate regulations on only some PVC plasticizers and stabilizers have led to the use of other hazardous substitutes. Policy loopholes that allow 'guilty' chemicals to be replaced with untested or insufficiently tested ones are unacceptable. This is particularly true in the case of phthalate plasticizers and organotin stabilizers since PVC accounts for the bulk of their use in industry, and since it requires more hazardous additives than any other plastic.

Hazardous additives are only part of the threat that we face from using common PVC products. The bulk of PVC waste is not recycled, but ends up in landfills and incinerators. PVC in landfills is of great concern because its hazardous additives leach from the plastic and cannot be contained. (Van der Naald 1998) Furthermore, the burning of PVC in accidental landfill fires adds to the global burden of dioxin, a potent toxin and can-

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cer-causing substance. (Costner 2000)  
Dioxin formation is also the main cause of concern around burning PVC in incinerators.

In order to stop the needless exposure of people, especially children, to the hazards of PVC, Greenpeace recommends that:

- The Consumer Product Safety Commission (CPSC) should regulate vinyl as a material. It should further prohibit the use of phthalates, lead, cadmium, organotins and other toxic or untested additives in consumer products. If necessary, the CPSC should seek new legislation in Congress to give them the authority to do this.
- Manufacturers of products designed for children or the home should disclose all of the chemical ingredients in their products.
- Manufacturers should commit to immediately eliminating soft vinyl from their products and establish a rigorous schedule for the elimination of hard vinyl.
- Retailers and distributors should remove vinyl products from the market.
- Parents should not purchase vinyl products to which children might be exposed such as toys, childcare items, clothing, school supplies, handbags, sports equipment or items for the home. Vinyl products should be returned to the manufacturer or retailer for a full refund.

**TABLE 1. Hazardous phthalates or organotin found in all products tested.**  
(Continued on next page)

Product	Prince Litchfield crib rail teether	Graco stroller rain cover	Goldberg sandals, size 2	General Mills Cheerios teether	Cribber pull-on vinyl pants, XL	Carter's waterproof mattress pad	Basics magnetic shower curtain liner	Babycare changing mat	1/2 Clairol hairbrush	Baby place-lined hat
Store	Babies R Us, Massachusetts	Babies R Us, Massachusetts	Babies R Us, Massachusetts	Burlington Coat Factory, Michigan	Burlington Coat Factory, Michigan	Burlington Coat Factory, Michigan	Wal-Mart, Louisiana	Wal-Mart, Louisiana	Macy's, DC	Children's Place, DC
DEHP	0.026%	18.76%	0%	0.0%	0.31%	0.0%	22.10%	0.66%	21.70%	30.30%
DINP	20.80%	0.90%	14.90%	98.7%	21.70%	6.88%	0%	6.7%	0%	0%
BBP	0%	0.02%	0%	0%	0%	0%	0%	0.0%	0%	0%
Phthalate Total	20.83%	19.62%	14.90%	28.72%	22.01%	6.98%	22.10%	7.41%	21.70%	20.30%
Bisphenol A	<100 ppm	<100 ppm	<100 ppm	<100 ppm	<100 ppm	<100 ppm	<100 ppm	<100 ppm	<100 ppm	<100 ppm
MBT	<0.3 ppb	2.1 ppb	13.1 ppb	NT	NT	NT	NT	173 ppb	102 ppb	6.3 ppb
DBT	<0.3 ppb	2.2 ppb	64.4 ppb	NT	NT	NT	NT	73.3 ppb	2,250 ppb	55.4 ppb
TBT	<0.3 ppb	0.4 ppb	0.6 ppb	NT	NT	NT	NT	4,120 ppb	5.6 ppb	2.6 ppb
TeBT	<0.4 ppb	<0.3 ppb	0.8 ppb	NT	NT	NT	NT	6.4 ppb	<0.3 ppb	<0.3 ppb
MOI	<0.4 ppb	1.9 ppb	860 ppb	NT	NT	NT	NT	<0.4 ppb	278 ppb	5.1 ppb
DOI	<0.4 ppb	1.6 ppb	5,860 ppb	NT	NT	NT	NT	<0.4 ppb	410 ppb	16.6 ppb
Organotin Total	<0.3 ppb	8.2 ppb	8778.9 ppb	NT	NT	NT	NT	4172.7 ppb	2945.6 ppb	86.1 ppb
Cadmium	<0.5 ppm	1.09 ppm	0.7 ppm	<0.5 ppm	<0.5 ppm	83.3 ppm	3 ppm	<0.5 ppm	32.9 ppm	0.8 ppm
Lead	<0.5 ppm	0.3 ppm	9.8 ppm	<0.5 ppm	<0.5 ppm	<0.5 ppm	12.4 ppm	<0.5 ppm	5.57 ppm	3.6 ppm

Abbreviations: **DEHP**, diethylhexyl phthalate; **DINP**, diisononyl phthalate; **BBP**, benzyl butyl phthalate; **MBT**, monobutyltin; **DBT**, dibutyltin; **TBT**, tributyltin; **TeBT**, tetrabutyltin; **MOI**, monoethyltin; **DOI**, dioctyltin; **ppm**, parts per million (1 ppm=0.0001%); **ppb**, parts per billion (1 ppb=0.000001%); **NT**, not tested.

The Toy Manufacturers of America's and Consumer Product Safety Commission's voluntary limit of DEHP is 3% in pacifiers and teething. The National Pollution Discharge Elimination Standard (NPDES) permits TBT in state waters at 0.05 ppb.

TABLE 1...

Product	Unex Corp. deep pile carpet cover	K.C. Products Inc. drawer liner	Manington floor tile; black, mottled	Safety 1 <sup>st</sup> Deluxe RollerShade sun screen car blind	The 1 <sup>st</sup> Years changing pad, 3 in 1 changing kit #4087	Packard, straw to hands free cup	Graham & Brown Blackburn vinyl border wallpaper #97764	FSC Walkoverings village solid vinyl wallpaper #38125	Armstrong Theatres Collection self stick urethane tile #21126	Armstrong, Self Stick II vinyl tile #26225
Store	Bed, Bath and Beyond New York	Bed, Bath and Beyond New York	Phoenicia California	Toys R Us Illinois	Target Illinois	Toys R Us Illinois	Home Depot Illinois	Home Depot Illinois	Home Depot Illinois	Home Depot Illinois
DEHP	24.70%	2.34%	1.66%	0.20%	0%	6.00%	8.24%	0.05%	0.04%	0.06%
DINP	4%	9.7%	1.36%	20.00%	25.00%	33.00%	0%	12.00%	3.57%	3.55%
BBP	0%	0.01%	0%	0%	0%	0%	0%	0%	1.13%	1.56%
Phthalate Total	24.70%	12.00%	2.89%	20.20%	25.00%	39.00%	8.24%	12.05%	4.54%	5.17%
Bisphenol A	<100 ppb	<100 ppb	<100 ppb	1.9 ppb	14.2 ppb	<100 ppb	<100 ppb	<100 ppb	<100 ppb	<100 ppb
MBP	3.2 ppb	NA	4.60 ppb	56.5 ppb	2.58 ppb	9.1 ppb	36.500 ppb	4.3 ppb	16.600 ppb	11.8 ppb
DBP	0.8 ppb	NA	3.160 ppb	143 ppb	3.230 ppb	134 ppb	719,000 ppb	38.5 ppb	46,800 ppb	32.6 ppb
TBT	1.1 ppb	NA	27.4 ppb	38.3 ppb	196 ppb	30.7 ppb	300 ppb	96.9 ppb	679 ppb	<0.3 ppb
TcBT	<0.3 ppb	NA	7.3 ppb	<0.3 ppb	<0.3 ppb	<0.3 ppb	<0.3 ppb	<0.3 ppb	<0.3 ppb	<0.3 ppb
MBT	2.8 ppb	NA	8.1 ppb	4.3 ppb	12 ppb	<0.3 ppb	76.6 ppb	<0.3 ppb	10,800 ppb	4,300 ppb
DOT	9.2 ppb	NA	34.8 ppb	2.8 ppb	11.4 ppb	<0.3 ppb	63.2 ppb	<0.3 ppb	43,400 ppb	25,800 ppb
Organotin Total	17.4 ppb	NA	3,677.6 ppb	244.9 ppb	3,707.4 ppb	173.8 ppb	776,508.6 ppb	139.7 ppb	118,179 ppb	33,144.4 ppb
Cadmium	<0.5 ppb	230 ppb	<0.5 ppb	<0.5 ppb	<0.5 ppb	<0.5 ppb	<0.5 ppb	<0.5 ppb	<0.5 ppb	<0.5 ppb
Lead	<0.5 ppb	15.1 ppb	0.77 ppb	<0.5 ppb	<0.5 ppb	<0.5 ppb	3.89 ppb	73.82 ppb	3.82 ppb	0.67 ppb

Abbreviations: DEHP, diethylhexyl phthalate; DINP, diisononyl phthalate; BBP, benzyl butyl phthalate; MBP, monobutyltin; DBP, dibutyltin; TBT, tributyltin; TeBT, tetrabutyltin; MOT, monooctyltin; DOT, dioctyltin; ppm, parts per million (1 ppm = 0.0001%); ppb, parts per billion (1 ppb = 0.000001%); NT, not tested.

The Toy Manufacturers of America's and Consumer Product Safety Commission's voluntary limit of DEHP is 3% in pacifiers and teething. The National Pollution Discharge Elimination Standard (NPDES) permits TBT in state waters at 0.05 ppb.



## Appendix I

### Health Effects Associated with Phthalates and Organotins

Chemical	Health Effects
Diethylhexyl phthalate (DEHP)	Probable human carcinogen, and potentially detrimental to immature male reproductive system. Animal studies show liver cancer and altered patterns of sexual development.
Disononyl phthalate (DINP)	Causes liver tumors and damages the kidneys in rodents. Alters sexual development in rats.
Benzyl butyl phthalate (BBP)	Alters sexual development in rats.
Tributyltin (TBT)	Interferes with nervous system and causes death at high levels in humans. Causes reduced reproduction and developmental problems in marine wildlife and rats.

## Appendix II

### Major U.S. Producers of PVC, Phthalates and Organotins

Company Name and Location	Chemical
Borden Chemicals and Plastics Operating Limited Partnership <i>Addis, Louisiana</i> <i>Geismar, Louisiana</i> <i>Illkopolis, Illinois</i>	PVC
Certain Teed Corporation <i>Lake Charles, Louisiana</i>	PVC
Colorite Polymers <i>Burlington, New Jersey</i>	PVC
Formosa Plastics Corporation, U.S.A. <i>Baton Rouge, Louisiana</i> <i>Delaware City, Delaware</i> <i>Point Comfort, Texas</i>	PVC
The Geon Company <i>Henry, Illinois</i>	PVC
Georgia Gulf Corporation <i>Aberdeen, Mississippi</i> <i>Oklahoma City, Oklahoma</i> <i>Plaquemine, Louisiana</i>	PVC
Kaneka Delaware Corp. <i>Delaware City, Delaware</i>	PVC
Keysor-Century Corporation <i>Saugus, California</i>	PVC

Company Name and Location	Chemical
OxyVinyls LP <i>Deer Park, Texas</i> <i>Louisville, Kentucky</i> <i>Pasadena, Texas</i> <i>Pedricktown, New Jersey</i> <i>Pottstown, Pennsylvania</i>	PVC
Shintech Incorporated <i>Freeport, Texas</i>	PVC
Union Carbide Corporation <i>Texas City, Texas</i>	PVC
Westlake PVC Corporation <i>Calvert City, Kentucky</i>	PVC
Solutia Inc. <i>Bridgeport, New Jersey</i>	BBP
Aristech Chemical Corporation Chemicals Division <i>Neville Island, Pennsylvania</i>	DEHP, DINP
Eastman Chemical Company Tennessee Eastman Division <i>Kingsport, Tennessee</i>	DEHP
Velsicol Chemical Corporation <i>Chestertown, Maryland</i>	DEHP
ExxonMobil Chemical Company <i>Baton Rouge, Louisiana</i>	DINP
Elf Atochem North America, Inc. Specialty Chemicals Division <i>Carrollton, Kentucky</i> <i>Axis, Alabama</i>	DBT, TBT compounds

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Company Name and Location	Chemical
Gelest, Inc. <i>Tullytown, Pennsylvania</i>	DBT compounds
Cardinal Companies, L.P. <i>Columbia, South Carolina</i>	DBT compounds
Ferro Corporation Performance and Fine Chemicals Group Polymer Additives Division <i>Walton Hills, Ohio</i>	DBT compounds
Atotech USA Inc. <i>Rock Hill, South Carolina</i>	DBT compounds
Johnson Matthey, Inc. Alfa Aesar <i>Ward Hill, Massachusetts</i>	DBT, TBT compounds
Aldrich Chemical Company, Inc. <i>(Location not specified)</i>	TBT compounds

Abbreviations: PVC, polyvinyl chloride; BBP, benzyl butyl phthalate; DEHP, diethylhexyl phthalate; DINP, diisononyl phthalate; DBT, dibutyltin; TBT, tributyltin.

Source: Directory of Chemical Producers: United States, 2000. SRI International.

## Appendix III

### PVC in Your Home

Consumers should beware of PVC products available for the home. Here's a list of the most common products on the market today. Go to the Greenpeace website for a virtual house that will show you how to find products not made from PVC. We also offer an online searchable database of alternatives for PVC used in construction. Over 200 companies are featured on the database.

**Visit the virtual home at:** <http://www.greenpeaceusa.org/toxics/house.htm>

**Search the online database for alternatives to PVC in construction:**  
[www.greenpeace.org.au/pvc/](http://www.greenpeace.org.au/pvc/)

Some other tips to be a PVC detective include:

- Look for packaging with the ♻ recycling symbol on it. That means it is PVC and rarely recycled.
- Often, PVC products are labeled "non-toxic vinyl," or "washable vinyl." The words vinyl and PVC are used synonymously.
- Plastic products that are soft and flexible and have a distinct odor are often PVC. If you are not sure, don't buy it. When you get home, call the product manufacturer and demand information about materials used in the product.

### APPLIANCES:

**Electronics** - TV, Video, Hi-Fi. In electrical and electronic products, plastics are mainly found in casings and cable sheathings. They are also found in circuit cards, component capsules, mechanical bearing parts and moving mechanical components, such as wheels and stub shafts.

**White Goods** - These include washing machines, dishwashers, refrigerators, and freezers. PVC is commonly found in cables, shelving and door gaskets.

### BUILDING MATERIALS:

**Home Siding** - PVC siding is widely used in the USA as a replacement for timber.

**Insulation** - The use of PVC profiles in cavity closure is increasing.

**Roofing Membranes** - Roofing film made of soft PVC is used on the insides of roofs as shielding and flashing against water.

**Pipes** - Rainwater guttering and drainpipes, water supply pipes, sewage and drainage pipes, protective pipes for cables.

**Electrical Cables and Wires** - Electricity cables, telephone and data cables, lighting cables and fittings - PVC coating is commonly used on cables and lines for the transfer of electricity and information.

**Door and Window Frames** - Door and window frames made from PVC-u (which stands for unplasticized PVC) are being heavily promoted by the industry as replacement windows and doors.

#### **CARS:**

**Interiors** - Some cars still contain PVC interiors, including seat upholstery and dashboards, although many companies are eliminating PVC.

**Undersealing** - Soft PVC is used in undersealing to prevent rust, and some car manufacturers have already eliminated its use.

#### **CHILDCARE PRODUCTS:**

**Mattress Covers** - Crib and bed mattress covers with a waterproof coating of PVC are commonly sold.

**Diaper Covers for Cloth Diapers** - Diaper covers are available in vinyl, and also in nylon and rubber.

**Bibs** - Many bibs are cotton or polyester coated with vinyl for waterproofing.

**Car Seats and Strollers** - Clear PVC is used for transparent covers to protect strollers from rain. The linings of some car seats are also made of vinyl.

**Toys** - Teethers, squeeze toys, inflatable toys and dolls are often made from PVC to make them soft and more marketable.

#### **CLOTHING:**

**Aprons** - PVC laminated textile is often used as a water-resistant material for aprons.

**Shoes** – Soft PVC is used in shoes and parts of shoes, such as soles, labels for logo imprints, upper parts made from vinyl imitation leather or PVC coatings.

**Boots and Waders** – ‘Rubber’ boots are sometimes made from PVC.

**Carrying Bags** – Sports bags, school bags, etc. are often made from nylon with a PVC coating as waterproofing.

**Luggage** – Soft PVC is often used as a surface coating, inner coating or for parts of products in bags, suitcases and other luggage.

**Clothes** – T-shirts with PVC prints (usually shiny), pants and raincoats (for waterproofing).

#### **HOME FURNISHINGS:**

**Vinyl Floor and Vinyl Wall Coverings** – Vinyl flooring is made of soft PVC, and other materials such as cork tiles may have a PVC coating. Cushion vinyl, sheet vinyl and vinyl tiles all represent types of vinyl flooring.

**Furniture** – Imitation leather and furniture film are made from soft PVC.

**Inflatable Furniture and Water Beds** – This furniture, which is often designed for a short life, is made of soft PVC.

**Venetian Blinds** – Venetian blinds are sometimes made of unplasticized PVC (PVC-u).

**Dish and Clothes Racks** – PVC is used to coat metal dish and clothes racks against rusting.

**Tablecloths** – Tablecloths are often vinyl, but also available in cotton, linen or polyester.

**Shower Curtains** – Shower curtains are often made of soft PVC, but are also available in nylon, cotton and polyester or a blend.

#### **GARDEN FURNITURE AND PRODUCTS:**

**Hoses** – Garden hoses are sometimes made of PVC though you can find some made of rubber.

**Tables and Chairs** – The least expensive garden furniture is usually u-PVC.

**Tarps** – Tarps are used for covering purposes, for example, over garden furniture and within the building sector, for trucks and storage tents. They are made from nylon or polyester, with a soft PVC coating.

**Swimming Pools** – Inflatable and non-inflatable children's pools are made of soft PVC, as well as swimming wings and rings.

**Lawnmower** – PVC will be found in cables for lawnmowers and other garden machinery.

**Greenhouses and Cold frames** - Corrugated PVC sheeting is often used as a cheaper alternative to glass for greenhouses and cold frames.

**Membrane pond liners** – PVC is sometimes used as a pond liner.

#### **MEDICAL PRODUCTS:**

**Medical Devices** – This product group is made up of products that are used directly in the treatment of patients. Soft PVC products include colostomy bags, catheters, urine bags, infusion sets and bloodbags. Other medical products include certain gloves, curtains, sheets, and shoe covers made from soft PVC.

#### **OFFICE EQUIPMENT AND SUPPLIES:**

**Equipment** - In items such as computers and fax/printers PVC is usually found in the cabling.

**Supplies** – Ring binders, folders, letter organizers, writing pads, clipboards, tape and calendars are often made of soft PVC.

#### **PACKAGING:**

**Packaging** - PVC in packaging includes disposable bottles (for oil, mineral water, vinegar etc.), food wrap, trays and boxes, bottles and jars, blister packaging and transportation packaging.

#### **SPORTS EQUIPMENT:**

**Weights** – Hand weights are often covered with brightly colored PVC coatings.

**Balls** – Many inexpensive balls, such as those used for soccer, are often vinyl, but leather and other types of plastic balls are also available.



## Appendix IV

### Alternatives to PVC

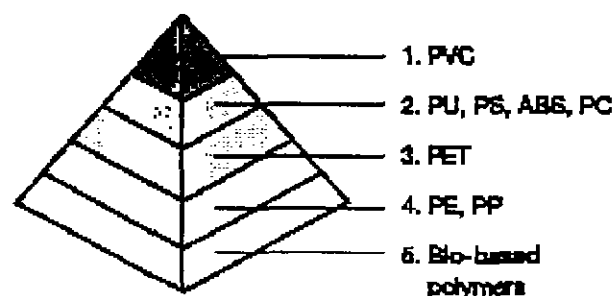
For virtually all PVC applications, safer alternatives exist, using more sustainable, traditional materials - such as paper, wood or local materials. PVC can also be replaced by a variety of other, less environmentally damaging plastics, although most plastics pose some risk to the environment and contribute to the global waste crisis.

Greenpeace has developed a pyramid of plastics to assist those making material selection to avoid PVC use. The guidance focuses on the toxic characteristics of the potential alternative materials. It provides a qualitative ranking based on environmental and health problems of PVC, addressing the production, additives and product emissions during use, disposal and recycling.

It does not include raw materials and energy inputs and therefore does not address all criteria of a life cycle analysis. It provides guidance for interim steps on the route to clean production. Ultimately, we should ask why we are using these materials and whether or not they are necessary.

### Pyramid of Plastics

The pyramid of plastics is a ranking of plastics according to their hazardous characteristics. PVC, the most problematic plastic, is at the top of the pyramid, and bio-based plastics, the least polluting of the plastics, are at the pyramid's base. It represents an ongoing process to qualify the main plastics in the economy. More plastics can be added as necessary, and qualifications may change depending upon new information on the material, such as in production processes or the use of toxic additives.



- 1) Polyvinyl chloride (PVC) and other halogenated plastics
- 2) Polyurethane (PU), Polystyrene (PS), Acrylonitrile-butadiene-styrene (ABS), Polycarbonate (PC)
- 3) Polyethylene-terephthalate (PET)
- 4) Polyolefins (PE, PP, etc.)
- 5) Bio-based plastics

Notes:

- Metallocene technology is a new way to widen the range of properties and applications of polyolefins. This will in turn help replace many rigid and soft PVC applications.
- TPE's are thermoplastic elastomers that can be made from many different mixes of different plastic monomers, short polymer chains. Currently most of the building blocks are polyolefins, but can also contain other polymers such as polyurethane. Therefore, TPE's can not be generally ranked in the pyramid of plastics.

### Additives

The addition of toxic additives can significantly change the environmental impacts of a plastic. For example, chloroparaffins or brominated flame retardants in polyolefins or bio-based plastic products with heavy metal stabilizers would significantly increase the hazard level of the plastic, and therefore change its position on the pyramid of plastics.

Furthermore, many additives are persistent organic pollutants (POPs) and can cause serious environmental damage.

### Genetically Modified Organisms (GMOs)

It is essential that the production of bio-based plastics does not involve the use of genetically modified organisms (GMOs) or allow the patenting of life.

**Polyvinyl chloride (PVC)** is unique in its high chlorine and additives content, which makes it an environmental poison throughout its life cycle. Vinyl chloride is a known human carcinogen. PVC releases dioxin and other persistent organic pollutants during its manufacture and disposal and cannot be readily recycled due to its chlorine and additive content. Furthermore, additives are not bound to the plastic and leach out.

**Polyurethane (PU)** is mainly used in insulation and soft foamed products like carpet underlay. It uses several hazardous intermediates and creates numerous hazardous byproducts. These include phosgene, isocyanates, toluene, diamines, and the ozone-depleting gases methylene chloride and CFCs, as well as halogenated flame retardants and pigments. The burning of PU releases numerous hazardous chemicals such as isocyanates, carbon dioxide, hydrogen cyanide, PAHs and dioxins.

**Polystyrene (PS)** is widely used for foam insulation and also for hard applications like cups and toys. Its production involves the use of known (benzene) and suspected human carcinogenic substances, such as styrene and 1,3-butadiene. Styrene is also known to be toxic to the reproductive system. PS can be technically recycled, but recycling rates are low, although still higher than for PVC.

**Acrylonitrile-Butadiene-Styrene (ABS)** is used as a hard plastic in many applications like pipes, car bumpers and toys (hard building blocks). ABS uses a number of hazardous chemicals. These include butadiene and styrene (see above) and acrylonitrile. Acrylonitrile

is highly toxic and readily absorbed by humans by inhalation and directly through the skin. Both the liquid and its vapor are highly toxic. Acrylonitrile is classified as a probable human carcinogen as are styrene and butadiene.

**Polycarbonate (PC)** is used for products like CDs and refillable milk bottles and is usually made with the highly toxic phosgene, which is derived from chlorine gas. PC does not need additives but does need solvents for its production, such as methylene chloride, a carcinogen. Other solvents used may include chloroform, 1,2-dichloroethylene, tetrachloroethane and chlorobenzene. A number of processes have been developed to reclaim polycarbonate from compact discs and PC milk and water bottles, for downcycling into lower quality products such as crates or building applications, or for mixing in small quantities with virgin material for higher grade products such as bottles.

**Polyethylene-Terephthalate (PET)** is made from ethylene glycol and dimethyl terephthalate. PET is generally used in packaging (e.g. bottles) and often contains additives such as UV stabilizers and flame retardants. PET recycling rates are high compared to other plastics.

**Polyolefins such as Polyethylene (PE) and Polypropylene (PP)** are simpler polymer structures that do not need plasticizers, although they do use additives such as UV and heat stabilizers, antioxidants and in some applications, flame retardants. The polyolefins pose fewer risks and have the highest potential for mechanical recycling. Both PE and PP are versatile and cheap, and can be designed to replace almost all PVC applications. PE can be made either hard, or very flexible, without the use of plasticizers. PP is easy to mold and can also be used in a wide range of applications.

In comparison with PVC, PE and PP contain fewer problematic additives, have reduced leaching potential in landfills, reduced potential for dioxin formation during burning (provided that brominated chlorinated flame retardants are not used), and reduced technical problems and costs during recycling.

**Bio-based Polymers** Biodegradable plastics from renewable sources (bio-based) are seen as a promising alternative for plastic products which have a short life cycle or are impractical to recycle, such as food packaging, agricultural plastics and other disposables. Bio-based plastics can be made out of products obtained from raw materials produced by natural living or growing systems, such as starch and cellulose. The advantage of bio-polymers is that they readily degrade and can be composted. Natural polymers include cellulose (from wood, cotton), horn (hardened protein) and raw rubber. Converted natural polymers include vulcanized rubber, vulcanized fiber, celluloid and casein protein.

## Appendix V

### Materials and Methods

#### Tests for Phthalates

The PVC products described in Table 1 were sent to STAT Analysis (AIHA proficient, NIST, NVLAP accredited) in Chicago, Illinois to be tested for the following phthalates: diethylhexyl phthalate (DEHP), benzyl butyl phthalate (BBP), dibutyl phthalate (DBP), diethyl phthalate (DEP), and diisononyl phthalate (DINP). The items were also tested for bisphenol A. All the samples were prepared and analyzed essentially according to EPA Methods 3550M and 8270M, respectively, as previously described. (DiGangi 1999)

#### Measurements of Metal Stabilizers

The levels of cadmium and lead contained in the PVC products studied here were also determined at STAT Analysis in Chicago according to a procedure as detailed before. (DiGangi 1997) Organotin analysis was conducted at GALAB laboratories in Geestacht, Germany by accredited methods after DIN EN 17025 to monitor the following organotins: mono-, di-, tri- and tetrabutyltin, mono- and di-octyltin, tricyclohexyltin and triphenyltin.

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From: Rick Hind [rick.hind@wdc.greenpeace.org]  
Sent: Thursday, June 07, 2001 4:37 PM  
To: mwind@cpsc.gov; cpssc-os@cpssc.gov  
Subject: REQ: BROADER SCOPE OF PVC PETITION (NOV. 1998)



Attachment information.



letterhead.doc



Attachment information.



FinalVinyl.PDF



Attachment information.



Cpscpet.doc



Attachment information.



EUPVC Resolution Paper.doc

SEE ATTACHED REPORT, PETITION & EU PAPER

June 6, 2001

Ms. Ann Brown, Chair  
U.S. Consumer Product Safety Commission  
Washington, D.C. 20207

Dear Ms. Brown,

We are writing this letter to petition the U.S. Consumer Product Safety Commission (CPSC) to expand the scope of a November 19, 1998 petition on polyvinyl chloride (PVC) plastic toys by Greenpeace and other groups to the U.S. Consumer Product Safety Commission 1. In that petition, we asked that your agency institute a ban on PVC plastic in all toys and other products intended for children five years of age and under. In addition, we urged that a national advisory be made on the health risks associated with soft PVC toys.

Given recent findings and developments discussed below, Greenpeace is calling upon the CPSC to broaden the scope of that 1998 petition to include all PVC products used in the home.

In March of this year, the European Union renewed its 1999 emergency ban on the use of six phthalates in PVC toys made for children under the age of three 2. Also since our 1998 petition, Greenpeace has conducted tests for phthalate plasticizers and organotin stabilizers in readily available PVC consumer products and home furnishings that children are likely to come into contact with in their daily lives. The results of the tests are presented in our May, 2001 report 3.

To summarize, the recent Greenpeace tests found that some of the highest levels of phthalates were found in products specifically designed for children's mouths. Other products contained the phthalate diethylhexyl phthalate (DEHP) significantly above the 3% voluntary cap set for pacifiers and teethingers. Although these products are not intended for children's mouths, some are very likely to be chewed by children. It was also discovered that diisononyl phthalate

(DINP), an ill-defined chemical mixture often containing untested isomers, is used in teething rings at over 20% by weight of the product. With respect to their organotin content, all but one of the tested products contained detectable amounts. Some organotins cause nervous system damage and even death at high levels of exposure. PVC plastic is unique among all plastics due to the large quantity of toxic additives (plasticizers, stabilizers, etc.) required for its use in consumer products.

As you may recall, this problem first came to light in 1985 and 1986 when the toy industry agreed to limit the amount of one phthalate (DEHP) in PVC toys to less than 3% and again in 1996 when lead in PVC mini-blinds was found to unnecessarily put children at risk because the lead was released to the surface of the blinds in the form of dust which children easily handled.

In light of new European regulations on phthalates in PVC products currently in place and the finding that a wide variety of vinyl products other than toys contain hazardous phthalates and organotins, Greenpeace is calling on the CPSC to take immediate action, whether by granting this petition or interim action. The CPSC should:

Immediately issue a warning in the Federal Register similar to its 1998 guidance for lead in consumer products. The warning should advise manufacturers, retailers and distributors and parents to end the unnecessary production, sale and use, respectively, of vinyl consumer products. The warning should not be limited to products designed for children.

Begin regulating vinyl (PVC plastics) as a hazardous material.

Prohibit the use of phthalates and organotins, in addition to lead, cadmium and other toxic or untested additives in all consumer products.

On behalf of the public, Greenpeace looks forward to the CPSC's timely response to this petition.

Sincerely,

Rick Hind  
Legislative Director,  
Greenpeace Toxics Campaign

Enclosures (3): 1. Greenpeace. 1998. Petition to the Consumer Product Safety Commission. European Commission. 2001. Excerpt of March 5 Decision.  
Harmon. 2001. This Vinyl House: Hazardous Additives in Vinyl Consumer Products and Home Furnishings.

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